

In response to the Office Action mailed December 9, 2004, please amend the application as follows and consider the remarks set forth below.

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims begin on page 6 of this paper.

Remarks begin on page 16 of this paper.

AMENDMENTS TO THE SPECIFICATION

Please replace Paragraphs [0003], [0004], [0007], [0019], [0020], [0055], with the following paragraphs rewritten in amendment format:

[0003] Metallic weld stud studs are typically solid, non-compressible bodies which are formed by standard fastener stamping methods such as being cold headed from rod materials. Such weld studs are welded to a component surface by using a known welding device which provides energy through the weld stud to melt both a circular sacrificial weldment element, as well as a portion of the component base material. The weld stud is fixed to the base material due to the commingling and cooling of the liquefied metals. The welding device, in particular a weld gun, grasps the weld stud using clamping jaws in a region between a shoulder of the stud and the end of the face to be welded. Each weld stud is placed into the mouth of weld gun one at a time immediately prior to welding. The size, weight, and configuration of these studs prevent their use in blow fed weld guns.

[0004] Increased fuel economy demands within transportation industries have ~~lead~~ led to the use of thinner and thinner gauge materials. In particular, metallic

composite materials and particularly aluminum composite materials with a polymer core have effectively been used as surface or skin materials for various structures. These very thin metallic laminates are typically coupled or fastened to a support structure by being fastened to the support structure on one side of the laminate. To this end, it is known to fasten ~~[[a]]~~ an ordinary weld stud to ~~[[a]]~~ the laminate structure to facilitate the coupling of the stud to the structure.

[0007] For the purpose of arc initiation, the head geometry of the stud must be designed accordingly. In this context, studs having a head with a conical tip are known in the art. Studs with a substantially flat head/front end are further ~~know~~ known, with an ignition tip formed in the center of the front end. Studs with a flat front end are further known in the art. The threaded stud is welded onto a metal sheet of the body in so-called short-time arc welding. Short-time arc welding is also known as stud welding, where a metal stud (threaded stud) is positioned so as to contact the sheet metal of the body. A pilot current is then turned on and the metal stud is again slightly lifted off from the sheet metal of the body. At the same time, an arc is drawn. Then, a welding current is turned on so that the facing surfaces of metal stud and body sheet metal are fused. The metal stud is then again lowered onto the sheet metal of the body so that the melts combine. The welding current is turned off and the whole fused mass solidifies.

[0019] In accordance with the teachings of another embodiment, there is provided a weld stud assembly for use with a drawn arc welding system that overcomes the deficiencies of the prior art. The weld stud assembly has a head having an annular weldment area. The annular weldment area has an exterior radius which conforms to

the exterior radius of the head. The annular weldment area functions to provide a weldment surface area which is about equal to the surface area from the typical circular weldment ~~[[are]]~~ area while improving the distribution of torsional stud loads into the sheet metal.

[0020] The features mentioned above and to be explained below are usable not only in the combination indicated in each instance, but are also usable in other combinations or standing alone, without exceeding the scope of the present invention. In accordance with the teachings of the present invention, there is provided a weld stud assembly for use with a drawn arc welding system that overcomes the deficiencies of the prior art. The weld stud assembly has a head having an annular weldment area. The annular weldment area has an exterior radius which conforms to the exterior radius of the head. The annular weldment area functions to provide a weldment surface area which is about equal to the surface area from the typical circular weldment are while improving the distribution of torsional stud loads into the sheet metal.

[0055] The threaded stud 10 has a head 14, which corresponds to the head 14' of the fastening system 9 of Figure 5. A welded joint between the threaded stud 10 and the sheet metal 20 of a car body is shown at 52. A shank 12 of the stud 10 is provided with a thread. The threaded stud 10 is weakened in the region of the transition between the shank 12 and the head 14, as is shown schematically at 58. In the fastening system 9, weakening is ~~effected~~ affected only in that the diameter of the shank 12 is distinctly smaller than the diameter of the head 14 and a welded section

lying under the latter and not described in detail. In addition, the transition between the shank 12 and the head 14 is designed as a sharp-edged corner.